

WEST Search History

DATE: Wednesday, March 17, 2004

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DB=PGPB,USPT; PLUR=YES; OP=ADJ

<input type="checkbox"/>	L9	l6 and arabidopsis	20
<input type="checkbox"/>	L8	L3 and arabidopsis	39
<input type="checkbox"/>	L7	l3 and rice	37
<input type="checkbox"/>	L6	proline dehydrogenase or prodh	36
<input type="checkbox"/>	L5	l3 and stress	47
<input type="checkbox"/>	L4	l3 and transgenic	51
<input type="checkbox"/>	L3	p5cs	117
<input type="checkbox"/>	L2	L1	70

DB=USPT; PLUR=YES; OP=ADJ

<input type="checkbox"/>	L1	p5cs	70
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END OF SEARCH HISTORY

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NEWS	13	DEC 09	STN Entry Date available for display in REGISTRY and CA/CAPlus
NEWS	14	DEC 17	DGENE: Two new display fields added
NEWS	15	DEC 18	BIOTECHNO no longer updated
NEWS	16	DEC 19	CROPU no longer updated; subscriber discount no longer available
NEWS	17	DEC 22	Additional INPI reactions and pre-1907 documents added to CAS databases
NEWS	18	DEC 22	IFIPAT/IFIUDB/IFICDB reloaded with new data and search fields
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NEWS	21	JAN 27	A new search aid, the Company Name Thesaurus, available in CA/CAPlus
NEWS	22	FEB 05	German (DE) application and patent publication number format changes
NEWS	23	MAR 03	MEDLINE and LMEDLINE reloaded
NEWS	24	MAR 03	MEDLINE file segment of TOXCENTER reloaded
NEWS	25	MAR 03	FRANCEPAT now available on STN
NEWS EXPRESS			MARCH 5 CURRENT WINDOWS VERSION IS V7.00A, CURRENT MACINTOSH VERSION IS V6.0b(ENG) AND V6.0Jb(JP), AND CURRENT DISCOVER FILE IS DATED 3 MARCH 2004
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FILE 'HOME' ENTERED AT 11:46:52 ON 17 MAR 2004

=> file agricola caplus biosis

COST IN U.S. DOLLARS

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SESSION

FULL ESTIMATED COST

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0.21

FILE 'AGRICOLA' ENTERED AT 11:46:59 ON 17 MAR 2004

FILE 'CAPLUS' ENTERED AT 11:46:59 ON 17 MAR 2004

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COPYRIGHT (C) 2004 BIOLOGICAL ABSTRACTS INC.(R)

=> s p5cs and (rice or arabidopsis)

L1 74 P5CS AND (RICE OR ARABIDOPSIS)

=> dup rem l1

PROCESSING COMPLETED FOR L1

L2 40 DUP REM L1 (34 DUPLICATES REMOVED)

=> d 1-10 ti

L2 ANSWER 1 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

TI Stress-inducible synthesis of proline in transgenic **rice** confers faster growth under stress conditions than that with constitutive synthesis

L2 ANSWER 2 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1

TI Proline accumulation and Δ 1-pyrroline-5-carboxylate synthetase gene properties in three **rice** cultivars differing in salinity and drought tolerance

L2 ANSWER 3 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

TI Monitoring expression profiles of **Arabidopsis** gene expression during rehydration process after dehydration using ca. 7000 full-length cDNA microarray

L2 ANSWER 4 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 2

TI Light-dependent induction of proline biosynthesis by abscisic acid and salt stress is inhibited by brassinosteroid in **Arabidopsis**.

L2 ANSWER 5 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

TI Drought-regulated expression of prolyl-tRNA synthetase genes in radish (*Raphanus sativus*) seedlings

L2 ANSWER 6 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3

TI Transgenic indica **rice** cvIR-50 over-expressing *Vigna aconitifolia* Δ 1-pyrroline-5-carboxylate synthetase cDNA shows tolerance to high salt

L2 ANSWER 7 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

TI Stress-regulated expression constructs and transgenic plants having

altered environmental stress tolerance

- L2 ANSWER 8 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Construction of stress tolerant transgenic grass plants with altered proline biosynthesis expressing a Δ 1-pyrroline-5-carboxylate synthetase gene or an antisense proline dehydrogenase gene
- L2 ANSWER 9 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Regulation of osmotic stress-responsive gene expression by the LOS6/ABA1 locus in *Arabidopsis*
- L2 ANSWER 10 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of hydrogen peroxide and nitric oxide on both salt and heat stress tolerance in *rice*

=> d so

- L2 ANSWER 1 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
SO Plant Science (Amsterdam, Netherlands) (2004), 166(4), 941-948
CODEN: PLSCE4; ISSN: 0168-9452

=> d 2 so

- L2 ANSWER 2 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
SO Plant Science (Amsterdam, Netherlands) (2003), 165(5), 1059-1068
CODEN: PLSCE4; ISSN: 0168-9452

=> d 2 ab

- L2 ANSWER 2 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
AB Three indica *rice* cultivars (*Oryza sativa*) differing in their tolerance to salt and drought stress in field conditions in Vietnam were analyzed at the mol. and biochem. levels with a goal to reveal the basis for their differential behavior and in particular for their ability to accumulate proline. An in vitro growth test showed that after a 7-day period of stress, the fresh weight of plantlet roots appears to be a relevant parameter for differentiating drought and salt tolerance of the concerned cultivars. Sodium level was lower in the salt tolerant cultivar than in the other *rice* cultivars. Proline accumulation in roots of tolerant cultivars starts earlier after the initiation of the stress treatment than that of the osmotic stress sensitive cultivar and also reaches a higher level. Proline accumulation was not related to proteolysis and so could be the result from induction of proline biosynthesis by osmotic stress. However, neither the sequence of amino acids involved in the proline feedback inhibition of the key regulatory enzyme Δ 1-pyrroline-5-carboxylate synthetase (**P5CS**; EC not assigned), nor the expression of the **p5cs** genes were modified in the tolerant cultivars. These observations suggest that proline accumulation in roots is a possible indicator of the osmotic tolerance in these *rice* cultivars. However, other mechanisms than those related to a change in **P5CS** regulation are responsible for the increased proline content.

=> d 3 so

- L2 ANSWER 3 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
SO Plant Journal (2003), 34(6), 868-887
CODEN: PLJUED; ISSN: 0960-7412

=> d 6 so

L2 ANSWER 6 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3
S0 Journal of Plant Biochemistry and Biotechnology (2003), 12(2), 109-116
CODEN: JPBEE; ISSN: 0971-7811

=> d 6 ab

L2 ANSWER 6 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3
AB *Oryza sativa* subspecies *indica* cultivar IR-50 was transformed with *Vigna aconitifolia* P5CS cDNA under the control of Ubiquitin (Ub) promoter and nos terminator using PDS 1000 He particle bombardment system. Integration of transgene was confirmed by Southern anal. Transgene expressed itself making mRNA and protein as evidenced by Northern and Western anal. of T2 plants. Active nature of protein made was substantiated by over-accumulation of proline in transgenic plants as compared to control. Transgene followed a 3:1 Mendelian ratio of inheritance. Marker free plants could be obtained due to segregation between marker gene and gene of interest in T2 generation. The transgenic plants showed better root growth and biomass development when grown in 200 mM NaCl, while control plants died within 20 days of salt stress. In one of the transgenic line with single copy transgene, plasmid rescue and the sequence anal. of the genomic region suggests that the P5CS transgene has got integrated into a region of chromosome 3.

=> d 8 pi

L2	ANSWER 8 OF 40	CAPLUS	COPYRIGHT 2004 ACS on STN		
	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	----	-----	-----	-----
PI	GB 2376236	A1	20021211	GB 2001-30946	20011224
	GB 2376236	B2	20030827		
	JP 2002369634	A2	20021224	JP 2001-174553	20010608
	US 2003014774	A1	20030116	US 2001-26767	20011227
	CN 1390939	A	20030115	CN 2001-144073	20011228

=> d 9 so

L2 ANSWER 9 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
S0 Journal of Biological Chemistry (2002), 277(10), 8588-8596
CODEN: JBCHA3; ISSN: 0021-9258

=> d 10 ab

L2 ANSWER 10 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
AB Higher plants growing in natural environments experience various abiotic stresses. H₂O₂ and nitric oxide (NO) free radicals are produced and cause oxidative damage to plants under various abiotic stress conditions. However, in the present study, we found that pretreating rice seedlings with low levels (<10 µM) of H₂O₂ or NO permitted the survival of more green leaf tissue, and of higher quantum yield for photosystem II, than in non-treated controls, under salt and heat stresses. It was also shown that the pretreatment induces not only active oxygen scavenging enzymes activities, but also expression of transcripts for stress-related genes encoding sucrose-phosphate synthase, Δ'-pyrroline-5-carboxylate synthase, and small heat shock protein 26. These results suggest that H₂O₂ and NO can increase both salt and heat tolerance in rice seedlings by acting as signal mols. for the response.

=> d 11-20 ti

- L2 ANSWER 11 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Fluorescence in situ hybridization of Δ^1 -pyrroline-5-carboxylate synthetase (P5CS) gene on rice chromosome
- L2 ANSWER 12 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Promtor of **Arabidopsis** thaliana Δ^1 -pyrroline-5-carboxylate synthetase gene regulates target gene expression under water stress
- L2 ANSWER 13 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 4
TI The **Arabidopsis** LOS5/ABA3 locus encodes a molybdenum cofactor sulfurase and modulates cold stress- and osmotic stress-responsive gene expression.
- L2 ANSWER 14 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 5
TI Functional analysis of salt-inducible proline transporter of barley roots.
- L2 ANSWER 15 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Transgenic approaches for generating rice tolerant of dehydration stress
- L2 ANSWER 16 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 6
TI Overexpression of the **Arabidopsis** CBF3 tanscriptional activator mimics multiple biochemical changes associated with cold acclimation.
- L2 ANSWER 17 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 7
TI Oscillation and regulation of proline content by P5CS and ProDH gene expressions in the light/dark cycles in **Arabidopsis** thaliana L.
- L2 ANSWER 18 OF 40 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Hypersensitivity of an **Arabidopsis** sugar signaling mutant toward exogenous proline application.
- L2 ANSWER 19 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Hypersensitivity of an **Arabidopsis** sugar signaling mutant toward exogenous proline application. [Erratum to document cited in CA133:147618]
- L2 ANSWER 20 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 8
TI Molecular cloning and characterization of a cDNA encoding proline transporter in rice

=> d 15 so

- L2 ANSWER 15 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
S0 Rice Genetics IV, [Proceedings of the International Rice Genetics Symposium], 4th, Los Banos, Philippines, Oct. 22-27, 2000 (2001), 423-438. Editor(s): Khush, G. S.; Brar, D. S.; Hardy, B. Publisher: Science Publishers, Inc., Enfield, N. H. CODEN: 69CFM6; ISBN: 1-57808-167-X

=> d 17 so

- L2 ANSWER 17 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 7
- SO Plant and cell physiology, Oct 2000. Vol. 41, No. 10. p. 1096-1101
Publisher: Kyoto, Japan : Japanese Society of Plant Physiologists.
CODEN: PCPHA5; ISSN: 0032-0781

=> d 17 ab

- L2 ANSWER 17 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 7
- AB The fluctuation of proline content, and protein and mRNA levels of delta(1)-pyrroline-5-carboxylate synthetase (P5CS) and proline dehydrogenase (ProDH), both of which are involved in proline biosynthesis and degradation, in the shoots of *Arabidopsis* grown in light/dark cycles were demonstrated under salt-stressed and unstressed conditions. Proline content, as well as proteins and mRNAs of these enzymes, clearly oscillated in the light/dark cycles under the stressed and unstressed conditions. A reciprocal relationship between P5CS and ProDH was observed. Protein levels of P5CS and ProDH were well synchronized with their mRNA levels, although the fluctuation of protein levels was not as significant as that of their mRNA levels. Both mRNA and protein levels of the two enzymes as well as the proline content did not oscillate under the continuous light or the dark conditions. Thus, P5CS and ProDH gene expressions seemed to be involved in light irradiation. Moreover, relative water content (RWC) in the plants oscillated in the light/dark cycles. The fluctuations of proline content in shoot reversely responded to that of RWC. It is suggested that the expression of two genes responds sensitively to a subtle change of cellular water status, and accumulated proline keeps the osmotic balance between cells and the outer environment.

=> d 21-30 ti

- L2 ANSWER 21 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 9
- TI Hypersensitivity of an *Arabidopsis* sugar signaling mutant toward exogenous proline application. [Erratum: June 2000, v. 123 (2), p. 777-790.]
- L2 ANSWER 22 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Structural analysis of Δ 1-pyrroline-5-carboxylate synthetase gene from *Bruguiera gymnorhiza*
- L2 ANSWER 23 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Water stress or salt stress tolerant transgenic cereal plants
- L2 ANSWER 24 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Stress-regulated expression constructs for improvement of plant tolerance of environmental stresses
- L2 ANSWER 25 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States

of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 10

TI Biological functions of proline in morphogenesis and osmotolerance
revealed in antisense transgenic *Arabidopsis thaliana*.

L2 ANSWER 26 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

TI Increase of proline content in transgenic rice plants with a
proline dehydrogenase antisense cDNA

L2 ANSWER 27 OF 40 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States
of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 11

TI Isolation and characterization of two different cDNAs of delta
1-pyrroline-5-carboxylate synthase in alfalfa, transcriptionally induced
upon salt stress.

L2 ANSWER 28 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 12

TI The presence of *p5cs* gene in rice and its function in
proline-overproducing rice plant lines

L2 ANSWER 29 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 13

TI Overexpression of a Δ 1-pyrroline-5-carboxylate synthetase gene and
analysis of tolerance to water- and salt-stress in transgenic rice

L2 ANSWER 30 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

TI Structure, function and regulation of *AtP5CS* genes in *Arabidopsis*

=> d 23 pi

L2 ANSWER 23 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	WO 9966785	A1	19991229	WO 1999-US14336	19990624
	W:	AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
	CA 2335522	AA	19991229	CA 1999-2335522	19990624
	AU 9947164	A1	20000110	AU 1999-47164	19990624

=> d 23 so

L2 ANSWER 23 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

SO PCT Int. Appl., 26 pp.
CODEN: PIXXD2

=> d 23 ab

L2 ANSWER 23 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

AB A transgenic cereal plant such as rice transformed with a
nucleic acid encoding an enzyme for proline biosynthesis confers water
stress or salt stress tolerance to the plant. The transgenic cereal plant
in which the nucleic acid encoding an enzyme for proline biosynthesis is
the *P5CS* (*P5CS*-129A) gene from mothbean (*Vigna aconitifolia*). A genetic promoter is also included and comprises the
rice actin 1 gene promoter.

=> d 26 so

L2 ANSWER 26 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
SO Nippon Joshi Daigaku Kiyo, Rigakubu (1999), 7, 45-53
CODEN: NJDRF7; ISSN: 0919-1593

=> d 26 ab

L2 ANSWER 26 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
AB Many plants accumulate compatible osmolytes, such as proline(Pro), or betaine, and sugar when they are subjected to salinity or drought stress. These compatible osmolytes appear to protect the plants from such stresses, which are the major factors that between the accumulation of compatible osmolytes and the adaptation to osmotic stress in plants. We are investigating plant responses to water stress, such as salinity or drought, to elucidate the mechanism of salinity tolerance in plants and to produce a salinity-tolerant plant. Among known compatible solutes, Pro is probably the most widely distributed osmolyte. The accumulation of Pro has been observed not only plants but also in eubacteria, marine invertebrates, protozoa, and algae. In plants, Pro is synthesized from L-glutamic acid (L-Glu) by two enzymes, Δ1-pyrroline-5-carboxylate (P5C) synthetase (P5CS) and P5C reductase (P5CR). L-pro is metabolized to L-Glu by two enzymes, proline dehydrogenase (ProDH) and P5C dehydrogenase (P5CDH). It has been reported that P5CS and ProDH are rate-limiting enzymes in Pro synthesis and metabolism of plants under water stress, resp. Therefore, it is expected that genetically engineered plants by overexpression of P5CS gene or suppression of ProDH gene overproduce Pro, and acquire osmotolerance, namely, the ability to tolerate environmental stresses such as high salinity and drought. Thus, we investigated whether or not transgenic plants with a ProDH antisense cDNA accumulate Pro of high level. In the present study, we generated transgenic rice plants with a ProDH antisense cDNA from *Arabidopsis thaliana* by Agrobacterium method. Several transgenics accumulated Pro at a significantly higher level than wild type plants under normal growth condition.

=> d 26

L2 ANSWER 26 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1999:500207 CAPLUS
DN 132:61678
TI Increase of proline content in transgenic rice plants with a proline dehydrogenase antisense cDNA
AU Aoki, Chisako; Yoshida, Yoshu; Sekiguchi, Fumiko
CS Dept. of Chemical and Biological Sciences, Japan Women's University, Japan
SO Nippon Joshi Daigaku Kiyo, Rigakubu (1999), 7, 45-53
CODEN: NJDRF7; ISSN: 0919-1593
PB Nippon Joshi Daigaku Rigakubu
DT Journal
LA Japanese

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AND TECHNOLOGY CORPORATION, AND FACHINFORMATIONSZENTRUM KARLSRUHE

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in at least one of the files. Refer to file specific help messages
or the STNGUIDE file for information on formats available in
individual files.
REENTER DISPLAY FORMAT FOR ALL FILES (FILEDEFAULT):ti

L2 ANSWER 26 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Increase of proline content in transgenic rice plants with a
proline dehydrogenase antisense cDNA

=> d 26
YOU HAVE REQUESTED DATA FROM FILE 'AGRICOLA, CAPLUS, BIOSIS' - CONTINUE? (Y)/N:y

L2 ANSWER 26 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1999:500207 CAPLUS
DN 132:61678
TI Increase of proline content in transgenic rice plants with a
proline dehydrogenase antisense cDNA
AU Aoki, Chisako; Yoshiba, Yoshu; Sekiguchi, Fumiko
CS Dept. of Chemical and Biological Sciences, Japan Women's University, Japan
SO Nippon Joshi Daigaku Kiyo, Rigakubu (1999), 7, 45-53
CODEN: NJDRF7; ISSN: 0919-1593
PB Nippon Joshi Daigaku Rigakubu
DT Journal
LA Japanese

=> d 26 ab
YOU HAVE REQUESTED DATA FROM FILE 'AGRICOLA, CAPLUS, BIOSIS' - CONTINUE? (Y)/N:y

L2 ANSWER 26 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
AB Many plants accumulate compatible osmolytes, such as proline(Pro), or
betaine, and sugar when they are subjected to salinity or drought stress.
These compatible osmolytes appear to protect the plants from such
stresses, which are the major factors that between the accumulation of
compatible osmolytes and the adaptation to osmotic stress in plants. We
are investigating plant responses to water stress, such as salinity or
drought, to elucidate the mechanism of salinity tolerance in
plants and to produce a salinity-tolerant plant. Among known compatible
solutes, Pro is probably the most widely distributed osmolyte. The
accumulation of Pro has been observed not only plants but also in eubacteria,
marine invertebrates, protozoa, and algae. In plants, Pro is synthesized
from L-glutamic acid (L-Glu) by two enzymes, Δ 1-pyrroline-5-
carboxylate (P5C) synthetase (P5CS) and P5C reductase (P5CR).
L-pro is metabolized to L-Glu by two enzymes, proline dehydrogenase

(ProDH) and P5C dehydrogenase (P5CDH). It has been reported that **P5CS** and ProDH are rate-limiting enzymes in Pro synthesis and metabolism of plants under water stress, resp. Therefore, it is expected that genetically engineered plants by overexpression of **P5CS** gene or suppression of ProDH gene overproduce Pro, and acquire osmotolerance, namely, the ability to tolerate environmental stresses such as high salinity and drought. Thus, we investigated whether or not transgenic plants with a ProDH antisense cDNA accumulate Pro of high level. In the present study, we generated transgenic **rice** plants with a ProDH antisense cDNA from **Arabidopsis thaliana** by Agrobacterium method. Several transgenics accumulated Pro at a significantly higher level than wild type plants under normal growth condition.

```
=> logoff stnguide
'STNGUIDE' IS NOT VALID HERE
For an explanation, enter "HELP LOGOFF".
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=> s 28 ab
      6 28
     142 AB
L3      0 28 AB
      (28(W)AB)
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=> del 13 y
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=> d 28 ab
YOU HAVE REQUESTED DATA FROM FILE 'AGRICOLA, CAPLUS, BIOSIS' - CONTINUE? (Y)/N:uy
YOU HAVE REQUESTED DATA FROM FILE 'AGRICOLA, CAPLUS, BIOSIS' - CONTINUE? (Y)/N:y
```

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L2 ANSWER 28 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 12
AB Hybridization anal. was conducted using proline synthase
  Δ'-pyrroline-5-carboxylate synthetase ( P5CS) cDNA from
  root nodule of cowpea as probe. The results indicated the presence of the
  homolog sequence of p5cs gene of cowpea nodule in rice
  plant. Its transcription level increased under salt stress. The proline
  content and salt tolerance of the filial generation (F9) of
  proline-overproducing rice plant lines were markedly higher than
  those of the original type. Using these proline-overproducing
  rice plant lines as exptl. materials to conduct hybridization
  anal., it has been shown that the high proline content characteristics and
  increased salt tolerance are correlated to the presence of this gene and
  its increased transcription level.
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=> d 28 so
YOU HAVE REQUESTED DATA FROM FILE 'AGRICOLA, CAPLUS, BIOSIS' - CONTINUE? (Y)/N:y
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L2 ANSWER 28 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 12
SO Zhiwu Shengli Xuebao (1998), 24(1), 49-54
  CODEN: CWSPDA; ISSN: 0257-4829
```

```
=> d 29 ab y
```

```
L2 ANSWER 29 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 13
AB A Δ1-pyrroline-5-carboxylate synthetase ( P5CS) cDNA from
  mothbean (Vigna aconitifolia L.) was introduced into the rice
```

(*Oryza sativa* L.) genome by the biolistic method. Expression of this **P5CS** transgene under the control of a stress-inducible promoter led to stress-induced overprod. of the **P5CS** enzyme and to proline accumulation in transgenic **rice** plants. Second-generation (R1) transgenic **rice** plants showed an increase in biomass under salt-stress and water-stress conditions as compared to the non-transformed control plants.

=> d 29 so 7

YOU HAVE REQUESTED DATA FROM FILE 'AGRICOLA, CAPLUS, BIOSIS' - CONTINUE? (Y)/N:y

L2 ANSWER 29 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 13
SO Plant Science (Shannon, Ireland) (1998), 139(1), 41-48
CODEN: PLSCE4; ISSN: 0168-9452

L2 ANSWER 7 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
SO U.S., 117 pp., Cont.-in-part of U.S. Ser. No. 18,233, abandoned.
CODEN: USXXAM

=> d 30 ab y

L2 ANSWER 30 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
AB A review with 25 refs. Proline is a common compatible osmolyte in higher plants. Proline accumulation in response to water stress and salinity is preceded by a rapid increase of the mRNA level of Δ 1-pyrro-line-5-carboxylate synthase (**P5CS**) controlling the rate-limiting step of glutamate-derived proline biosynthesis. **P5CS** is encoded by two differentially regulated genes in **Arabidopsis**. Gene AtP5CS1 mapped to chromosome 2-78.5 is expressed in most plant organs, but silent in dividing cells. Gene AtP5CS2 located close to marker m457 on chromosome 3-101.3, and is responsible for the synthesis of abundant **P5CS** mRNA in dividing cells. Accumulation of AtP5CS transcripts is regulated in a tissue specific manner and inducible by drought, salinity, ABA, and to lesser extent by auxin. Induction of AtP5CS1 mRNA accumulation in salt-treated seedlings involves an immediate early transcriptional response regulated by ABA signaling. Inhibition of protein synthesis by cycloheximide affects the induction of AtP5CS mRNA accumulation. Mutations *abal*, *ab1* and *axr2*, affecting ABA synthesis and perception in **Arabidopsis**, reduce the accumulation of both AtP5CS mRNAs during salt-stress, whereas ABA-signaling functions defined by the *abi2* and *abi3* mutations have no effect on salt-induction of the AtP5CS genes. Promoter regions of the AtP5CS genes has been cloned and the sequence of 1 kb. fragments has been determined. Sequence anal. of the promoter regions of the AtP5CS genes revealed the presence of putative conserved cis-acting elements, including a G-box. CDNA of AtP5CS1 has been placed under the control of different plant promoter sequences in binary expression vectors. Genetic transformation of tobacco and alfalfa resulted in the regeneration of transgenic plants containing increased internal proline content. Studies on the effect of proline accumulation on salt and drought tolerance is in progress.

=> d 30 so y

L2 ANSWER 30 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
SO Biotechnology & Biotechnological Equipment (1998), (2), 3-10

=> d 31-40 ti y

- L2 ANSWER 31 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Regulation of proline biosynthesis in plants subjected to osmotic stress
- L2 ANSWER 32 OF 40 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States
of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 14
TI Calcium signalling in *Arabidopsis thaliana* responding to drought
and salinity.
- L2 ANSWER 33 OF 40 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States
of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 15
TI Characterization of the gene for delta 1-pyrroline-5-carboxylate
synthetase and correlation between the expression of the gene and salt
tolerance in *Oryza sativa* L.
- L2 ANSWER 34 OF 40 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States
of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 16
TI Proline accumulation and salt-stress-induced gene expression in a
salt-hypersensitive mutant of *Arabidopsis*.
- L2 ANSWER 35 OF 40 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States
of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 17
TI Differential expression of two *P5CS* genes controlling proline
accumulation during salt-stress requires ABA and is regulated by ABA1,
ABI1, and AXR2 in *Arabidopsis*.
- L2 ANSWER 36 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 18
TI Characterization of Δ 1-pyrroline-5-carboxylate synthetase gene
promoter in transgenic *Arabidopsis thaliana* subjected to water
stress
- L2 ANSWER 37 OF 40 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States
of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 19
TI Reciprocal regulation of delta 1-pyrroline-5-carboxylate synthetase and
proline dehydrogenase genes control proline levels during and after
osmotic stress in plants.
- L2 ANSWER 38 OF 40 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Regulation of proline accumulation and *P5CS* gene expression in a
salt-hypersensitive *Arabidopsis* mutant.
- L2 ANSWER 39 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
TI Water stress-induced genes in *Arabidopsis thaliana*
- L2 ANSWER 40 OF 40 AGRICOLA Compiled and distributed by the National
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(2004) on STN DUPLICATE 20

TI Correlation between the induction of a gene for delta 1-pyrroline-5-carboxylate synthetase and the accumulation of proline in **Arabidopsis thaliana** under osmotic stress.

=> d 31 ab y

L2 ANSWER 31 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
AB Unavailable

=> d 31 so y

L2 ANSWER 31 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN
SO (1997) 109 pp. Avail.: UMI, Order No. DA9813376
From: Diss. Abstr. Int., B 1998, 58(10), 5277

=> d 33 ab 7

YOU HAVE REQUESTED DATA FROM FILE 'AGRICOLA, CAPLUS, BIOSIS' - CONTINUE? (Y)/N:7
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YOU HAVE REQUESTED DATA FROM FILE 'AGRICOLA, CAPLUS, BIOSIS' - CONTINUE? (Y)/N:y

L2 ANSWER 33 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 15

AB A cDNA for delta1-pyrroline-5-carboxylate (P5C) synthetase (cOsP5CS), an enzyme involved in the biosynthesis of proline, was isolated and characterized from a cDNA library prepared from 14-day-old seedlings of *Oryza sativa* cv. Akibare. The deduced amino acid sequence of the P5CS protein (OsP5CS) from *O. sativa* exhibited 74.2% and 75.5% homology to that of the P5CS from **Arabidopsis thaliana** and *Vigna aconitifolia*, respectively. Northern blot analysis revealed that the gene for P5CS (OsP5CS) was induced by high salt, dehydration, treatment of ABA and cold treatment, while it was not induced by heat treatment. Simultaneously, accumulation of proline was observed as a result of high salt treatment in *O. sativa*. Moreover, the levels of expression of OsP5CS mRNA and content of proline under salt stress condition were compared between a salt-tolerant cultivar, Dee-gee-woo-gen (DGWG) and a salt-sensitive breeding line, IR28. It was observed that the expression of the P5CS gene and the accumulation of proline in DGWG steadily increased, whereas those in IR28 increased slightly.

L2 ANSWER 7 OF 40 CAPLUS COPYRIGHT 2004 ACS on STN

AB Transgenic plants with improved resistance to plant stress, especially cold, carry expression cassettes for genes improving stress tolerance under control of a promoter containing a stress-regulated genetic element. Increased levels of expression of the gene are obtained by using a fusion protein of a protein binding the stress-regulated element and an efficient transcription activation factor. A transcription factor, CBF1, binding to C-repeat/DRE (C-repeat cold and drought regulation element) was identified in **Arabidopsis** and a cDNA encoding it was cloned and its function confirmed by gel shift and reporter gene expts. in *Saccharomyces cerevisiae*. The protein appears to be a member of the AP-2 transcription factor family. The CBF1 gene was induced by cold. Expression of the CBF1 gene from a 35S promoter in plants that had not been adapted to the cold increased the level of expression of the COR (cold-response) genes and a

marked increase in freezing tolerance. Expression vectors using stress responsive promoters for use in cereal are described. An number of homologs of CBF1 from a range of plants are cloned. A method for altering an environmental stress tolerance of a plant is provided which comprises the steps of transforming a plant with a promoter which regulates expression of at least one copy of a gene encoding a binding protein capable of binding to a DNA regulatory sequence (CCGAC) which regulates one or more environmental stress tolerance genes in the plant; expressing the binding protein encoded by the gene; and stimulating expression of at least one environmental stress tolerance gene through binding of the binding protein to the DNA regulatory sequence.

=> d 33 so y

L2 ANSWER 33 OF 40 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 15
S0 Plant molecular biology, Mar 1997. Vol. 33, No. 5. p. 857-865
Publisher: Dordrecht : Kluwer Academic Publishers.
CODEN: PMBIDB; ISSN: 0167-4412

=> dis his

(FILE 'HOME' ENTERED AT 11:46:52 ON 17 MAR 2004)

L1 FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 11:46:59 ON 17 MAR 2004
74 S P5CS AND (RICE OR ARABIDOPSIS)
L2 40 DUP REM L1 (34 DUPLICATES REMOVED)

FILE 'STNGUIDE' ENTERED AT 11:55:29 ON 17 MAR 2004

FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 11:57:51 ON 17 MAR 2004

FILE 'STNGUIDE' ENTERED AT 11:57:53 ON 17 MAR 2004

FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 11:58:04 ON 17 MAR 2004

FILE 'STNGUIDE' ENTERED AT 11:58:04 ON 17 MAR 2004

FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 11:58:13 ON 17 MAR 2004

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FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:01:43 ON 17 MAR 2004

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FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:02:08 ON 17 MAR 2004

FILE 'STNGUIDE' ENTERED AT 12:02:09 ON 17 MAR 2004

FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:02:25 ON 17 MAR 2004

FILE 'STNGUIDE' ENTERED AT 12:02:25 ON 17 MAR 2004

FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:02:39 ON 17 MAR 2004

FILE 'STNGUIDE' ENTERED AT 12:02:39 ON 17 MAR 2004

FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:03:28 ON 17 MAR 2004
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 FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:04:51 ON 17 MAR 2004
 FILE 'STNGUIDE' ENTERED AT 12:04:52 ON 17 MAR 2004
 FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:04:59 ON 17 MAR 2004
 FILE 'STNGUIDE' ENTERED AT 12:04:59 ON 17 MAR 2004
 FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:05:04 ON 17 MAR 2004
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 FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:05:29 ON 17 MAR 2004
 FILE 'STNGUIDE' ENTERED AT 12:05:30 ON 17 MAR 2004
 FILE 'AGRICOLA, CAPLUS, BIOSIS' ENTERED AT 12:05:58 ON 17 MAR 2004
 FILE 'STNGUIDE' ENTERED AT 12:05:59 ON 17 MAR 2004

=> s (proline dehydrogenase or prodh) and arabidopsis
 0 PROLINE
 0 DEHYDROGENASE
 0 PROLINE DEHYDROGENASE
 (PROLINE (W) DEHYDROGENASE)
 0 PRODH
 0 ARABIDOPSIS
 L3 0 (PROLINE DEHYDROGENASE OR PRODH) AND ARABIDOPSIS

=> s proline dehydrogenase or prodh
 0 PROLINE
 0 DEHYDROGENASE
 0 PROLINE DEHYDROGENASE
 (PROLINE (W) DEHYDROGENASE)
 0 PRODH
 L4 0 PROLINE DEHYDROGENASE OR PRODH

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FULL ESTIMATED COST	0.18	79.08
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=> s (proline dehydrogenase or prodh) and arabidopsis
L5 42 (PROLINE DEHYDROGENASE OR PRODH) AND ARABIDOPSIS

=> dup rem l5
PROCESSING COMPLETED FOR L5
L6 22 DUP REM L5 (20 DUPLICATES REMOVED)

=> d 1-10 ti

- L6 ANSWER 1 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
TI Tobacco Transformants Bearing Antisense Suppressor of **Proline Dehydrogenase** Gene, Are Characterized by Higher Proline Content and Cytoplasm Osmotic Pressure
- L6 ANSWER 2 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
TI Monitoring expression profiles of **Arabidopsis** gene expression during rehydration process after dehydration using ca. 7000 full-length cDNA microarray
- L6 ANSWER 3 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
TI Toxicity of free proline revealed in an **Arabidopsis** T-DNA-tagged mutant deficient in **proline dehydrogenase**
- L6 ANSWER 4 OF 22 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 2
TI Light-dependent induction of proline biosynthesis by abscisic acid and salt stress is inhibited by brassinosteroid in **Arabidopsis**.
- L6 ANSWER 5 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3
TI Drought-regulated expression of prolyl-tRNA synthetase genes in radish (*Raphanus sativus*) seedlings
- L6 ANSWER 6 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
TI Construction of stress tolerant transgenic grass plants with altered proline biosynthesis expressing a Δ 1-pyrroline-5-carboxylate synthetase gene or an antisense **proline dehydrogenase** gene
- L6 ANSWER 7 OF 22 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 4
TI ACTCAT, a novel cis-acting element for proline- and hypoosmolarity-responsive expression of the **ProDH** gene encoding **proline dehydrogenase** in **Arabidopsis**.
- L6 ANSWER 8 OF 22 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 5
TI Altered levels of **proline dehydrogenase** cause hypersensitivity to proline and its analogs in **Arabidopsis**.
- L6 ANSWER 9 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
TI Proline degradation enzyme antisense suppression for plant stress tolerance improvement
- L6 ANSWER 10 OF 22 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI The effects of exogenous proline and proline analogues on in vitro shoot organogenesis in **Arabidopsis**.

=> d so

L6 ANSWER 1 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
SO Russian Journal of Genetics (Translation of Genetika (Moscow, Russian Federation)) (2004), 40(2), 216-218
CODEN: RJGEEQ; ISSN: 1022-7954

=> d 3 ab

L6 ANSWER 3 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
AB The toxicity of proline (Pro) to plant growth has raised questions despite its protective functions in response to environmental stresses. To evaluate Pro toxicity, we isolated an **Arabidopsis** T-DNA-tagged mutant, pdh, that had a defect in Pro dehydrogenase (AtProDH), which catalyzes the first step of Pro catabolism. The pdh mutant showed hypersensitivity to exogenous application of ≤ 10 mM L-Pro, at which wild-type plants grew normally. A dose-dependent increase in internal free Pro accumulation was observed in pdh plants during external Pro supply. These results do not just prove the toxicity of Pro, but also suggest that AtProDH is the only enzyme acting as a functional **ProDH** in **Arabidopsis**. To further analyze the targets of Pro toxicity, we compared the expression of thousands of genes by pdh plants with that by wild-type plants by cDNA microarray anal. Most genes were unaffected. Here we demonstrate Pro toxicity by using the pdh mutant and discuss a cause-and-effect action between an excess of free Pro and growth inhibition in **Arabidopsis**.

=> d 3 so

L6 ANSWER 3 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
SO Plant and Cell Physiology (2003), 44(5), 541-548
CODEN: PCPHA5; ISSN: 0032-0781

=> d 4 ab

L6 ANSWER 4 OF 22 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 2
AB Osmotic stress-induced accumulation of proline, an important protective osmolyte in higher plants, is dependent on the expression of delta1-pyrroline-5-carboxylate synthase (P5CS) and **proline dehydrogenase** (PDH) enzymes that catalyze the rate-limiting steps of proline biosynthesis and degradation, respectively. Proline metabolism is modulated by differential regulation of organ specific expression of PDH and duplicated P5CS genes in **Arabidopsis**. Stimulation of proline synthesis by abscisic acid (ABA) and salt stress correlates with a striking activation of P5CS1 expression. By contrast, P5CS2 is only weakly induced, whereas PDH is inhibited to different extent by ABA and salt stress in shoots and roots of light-grown plants. Proline accumulation and light-dependent induction of P5CS1 by ABA and salt stress is inhibited in dark-adapted plants. During dark adaptation P5CS2 is also down-regulated, whereas PDH expression is significantly enhanced in shoots. The inhibitory effect of dark adaptation on P5CS1 is mimicked by the steroid hormone brassinolide. However, brassinolide fails to stimulate PDH, and inhibits P5CS2 only in shoots. Proline accumulation and induction of P5CS1 transcription are simultaneously enhanced in the ABA-hypersensitive prl1 and brassinosteroid-deficient det2 mutants, whereas P5CS2 shows enhanced induction by ABA and salt only in the det2 mutant. In comparison, the prl1 mutation reduces the basal level of PDH expression, whereas the det2 mutation enhances the inhibition of PDH by ABA. Regulation of P5CS1

expression thus appears to play a principal role in controlling proline accumulation stimulated by ABA and salt stress in **Arabidopsis**.

=> d 6 so

L6 ANSWER 6 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
SO Brit. UK Pat. Appl., 57 pp.
CODEN: BAXXDU

=> d 6 pi

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	GB 2376236	A1	20021211	GB 2001-30946	20011224
	GB 2376236	B2	20030827		
	JP 2002369634	A2	20021224	JP 2001-174553	20010608
	US 2003014774	A1	20030116	US 2001-26767	20011227
	CN 1390939	A	20030115	CN 2001-144073	20011228

=> d 8 ab

L6 ANSWER 8 OF 22 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved.
(2004) on STN . DUPLICATE 5

AB Pro dehydrogenase (PDH) catalyzes the first and rate-limiting step in the Pro catabolic pathway. In **Arabidopsis**, this enzyme is encoded by At-PDH. To investigate the role of Pro catabolism in plants, we generated transgenic **Arabidopsis** plants with altered levels of PDH by sense (PDH-S plants) and antisense (PDH-AS plants) strategies. Free Pro levels were reduced by up to 50% in PDH-S plants under stress and recovery conditions and enhanced by a maximum of 25% in PDH-AS plants, despite large modifications of the At-PDH transcript and At-PDH protein levels. A similar trend in free Pro levels was observed in the PDH-S and PDH-AS seeds without visible effects on germination or growth. Under stress conditions, PDH transgenic plants showed no signs of change in osmotolerance. However, addition of exogenous Pro increased survival rates of salt-stressed PDH-S plants by 30%. Isotope-labeling studies showed that the conversion of [14C]Pro to Glu was reduced in PDH-AS plants and increased in PDH-S plants, especially under stress conditions. Furthermore, PDH-AS plants were hypersensitive to exogenous Pro, whereas PDH-S plants were sensitive to Pro analogs. These findings demonstrate that altered At-PDH levels lead to weakly modified free Pro accumulation with a limited impact on plant development and growth, suggesting a tight control of Pro homeostasis and/or gene redundancy.

=> d 9 pi

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001186879	A2	20010710	JP 2000-5221	20000105

=> d 9 pd

'PD' IS NOT A VALID FORMAT

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individual files.

REENTER DISPLAY FORMAT FOR ALL FILES (FILEDEFAULT):ti

L6 ANSWER 9 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
TI Proline degradation enzyme antisense suppression for plant stress
tolerance improvement

=> d 11-22 ti

L6 ANSWER 11 OF 22 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Promoter analysis of **ProDH** gene induced by hypoosmolarity and
L-Pro in **Arabidopsis thaliana**.

L6 ANSWER 12 OF 22 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States
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(2004) on STN DUPLICATE 6
TI Oscillation and regulation of proline content by P5CS and **ProDH**
gene expressions in the light/dark cycles in **Arabidopsis**
thaliana L.

L6 ANSWER 13 OF 22 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Hypersensitivity of an **Arabidopsis** sugar signaling mutant toward
exogenous proline application.

L6 ANSWER 14 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
TI Hypersensitivity of an **Arabidopsis** sugar signaling mutant toward
exogenous proline application. [Erratum to document cited in CA133:147618]

L6 ANSWER 15 OF 22 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States
of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 7
TI Hypersensitivity of an **Arabidopsis** sugar signaling mutant toward
exogenous proline application. [Erratum: June 2000, v. 123 (2), p.
777-790.]

L6 ANSWER 16 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 8
TI Antisense suppression of proline degradation improves tolerance to
freezing and salinity in **Arabidopsis thaliana**

L6 ANSWER 17 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
TI Increase of proline content in transgenic rice plants with a
proline dehydrogenase antisense cDNA

L6 ANSWER 18 OF 22 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States
of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 9
TI A gene encoding **proline dehydrogenase** is not only
induced by proline and hypoosmolarity, but is also developmentally
regulated in the reproductive organs of **Arabidopsis**.

L6 ANSWER 19 OF 22 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Expression analysis of the **erd5** gene that encodes **proline**
dehydrogenase in **Arabidopsis thaliana**.

L6 ANSWER 20 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 10
TI Water and salt stress-induced alterations in proline metabolism of
Triticum durum seedlings

L6 ANSWER 21 OF 22 AGRICOLA Compiled and distributed by the National
Agricultural Library of the Department of Agriculture of the United States

of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 11

TI A nuclear gene encoding mitochondrial **proline dehydrogenase**, an enzyme involved in proline metabolism, is upregulated by proline but downregulated by dehydration in **Arabidopsis**.

L6 ANSWER 22 OF 22 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 12

TI Reciprocal regulation of delta 1-pyrroline-5-carboxylate synthetase and **proline dehydrogenase** genes control proline levels during and after osmotic stress in plants.

=> d 16 so

L6 ANSWER 16 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 8
S0 FEBS Letters (1999), 461(3), 205-210
CODEN: FEBLAL; ISSN: 0014-5793

=> d 19 ab

L6 ANSWER 19 OF 22 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN

=> d 19 so

L6 ANSWER 19 OF 22 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
S0 Plant and Cell Physiology, (1998) Vol. 39, No. SUPPL., pp. S105. print.
Meeting Info.: 1998 Annual Meeting of the Japanese Society of Plant Pathologists. Tokyo, Japan. May 3-5, 1998. Japanese Society of Plant Pathologists.
CODEN: PCPHA5. ISSN: 0032-0781.

=> d 20 ab

L6 ANSWER 20 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 10
AB Many plants accumulate proline as a non-toxic and protective osmolyte under saline or dry conditions. Its accumulation is caused by both the activation of its biosynthesis and inactivation of its degradation. The alterations induced by water and salt stress in the proline metabolism and amino acid content of 5-day-old seedlings of *Triticum durum* cv. Simeto were investigated. Most of the amino acids showed an increase with the induction of either stress, but proline increased more markedly than did other amino acids. Also measured were the activities of two enzymes, Δ 1-pyrroline-5-carboxylate (P5C) reductase (E.C. 1.5.1.2) and **proline dehydrogenase**, which are involved in proline biosynthesis and catabolism, resp. The activity of P5C reductase was enhanced during both water and salt stress, while **proline dehydrogenase** was inhibited only during salt stress. The results indicate that synthesis de novo is the predominant mechanism in proline accumulation in durum wheat. Use of a cDNA clone that encodes P5C-reductase from **Arabidopsis thaliana**, showed no differences in the gene expression between controls and stressed plants, implying that the increase in enzyme activity is unrelated to the expression of this gene.